The Physics of Metals and Metallography

ФИЗИКА МЕТАЛЛОВ и МЕТАЛЛОВЕДЕНИЕ

VOL. 50 1980

Published October 1981

THE PHYSICS OF METALS AND METALLOGRAPHY
FIZIKA METALLOV I METALLOVEDENIE

VOLUME 50, No. 1, 1980

Chief Editor:
S. V. VONSOVSKII

Deputy Chief Editor:
V. I. ARKHAROV

EDITORIAL BOARD:

V. I. ARKHAROV, A. N. ORLOV, S. V. VONSOVSKII, V. A. PAVLOV, V. D. KUZNETSOV, V. D. SADOVSKII, G. V. KURDYUMOV, R. I. IANUS, B. G. LAZAREV, YA. S. SHUR, A. G. LESNIK

Translation Editor:
Professor J. Christian

Translator:
V. Alford

The Physics of Metals and Metallography is a cover-to-cover translation of *Fizika metallov i metallovedenie* and is published monthly by Pergamon Press in collaboration with the Board of Governors of Acta Metallurgica.

Issued monthly. Two volumes per annum consisting of six issues each and containing approximately 200 pages per issue.

Publishing and Advertising Offices

Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 0BW, England
Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A.

Annual Subscriptions (1981) are:

To Libraries, Research Establishments, all other multiple-reader institutions and individuals $430.00 *including postage and insurance. Two year subscription rate (1981/1982):* $817.00.
To members of co-operating and sponsoring societies of Acta Metallurgica, $25.00 *including postage.*

Subscriptions are only serviced after payment has been received, and are not accepted for less than one year.

Subscription enquiries from customers in North America should be sent to: Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A., and for the remainder of the world to: Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 0BW, U.K.

Microform Subscriptions and Back Issues:

Back issues of all previously published volumes are available in the regular editions and on microfilm and microfiche. Current subscriptions are available on microfiche simultaneously with the paper edition and on microfilm on completion of the annual index.

Copyright © 1981 Pergamon Press Ltd.

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means: electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise without permission in writing from the publishers.

U.S. Copyright Law Applicable to Users in the U.S.A.

The appearance of the code on the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use or for the personal or internal use of specific clients. This consent is given on the condition, however, that for copying beyond that permit ed by Sections 107 or 108 of the US Copyright Law, the copier pays the per-copy fee included in the code. The appropriate remittance should be forwarded with a copy of the first page of the article to the Copyright Clearance Center Inc., 21 Congress Street, Salem MA 01970. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works or for resale. Copies of articles published prior to 1978 may be made under similar conditions.

PUBLISHED BY

PERGAMON PRESS
OXFORD·NEW YORK·PARIS·FRANKFURT

THE PHYSICS OF METALS AND METALLOGRAPHY

FIZIKA METALLOV I METALLOVEDENIE

VOLUME 50, No. 1 — CONTENTS — 1980

V. P. KALASHNIKOV, N. V. KOZHEVNIKOV and A. B. ZOLOTOVITSKIY	1	Electronic processes of spin relaxation in ferromagnetic metals and semiconductors. I. General relations
V. N. SYROMYATNIKOV and O. V. GURIN	13	Group theory analysis of phase transitions of the ordering type in simple crystals
V. V. KISELEV and V. T. SHMATOV	20	Multipole moment expansion of fields generated by dislocations moving in an unbounded elasto-isotropic medium
YA. M. POGOSYAN and G. G. SHAKARYAN	31	Low-frequency parade motion of domain walls
V. A. MATVEYEV, N. I. SHCHEGOLIKHINA G. V. FEDOROV and N. V. VOLKENSHTEYN	35	Normal Hall effect of Pd and its alloys with Fe, Co and Ni
R. S. ISKHAKOV, A. BAKHRIDINOV and L. A. CHEKANOVA	41	Temperature dependence of the resistivity of amorphous $Co_{1-x}P_x$ alloys
V. V. KELAREV, A. N. PIROGOV, V. V. CHUYEV, A. P. VOKHMYANIN and S. K. SIDOROV	46	Neutron diffraction investigation of the temperature dependence of the magnetization of sublattices in compound $TbCo_{5.1}$
E. V. GALOSHINA, L. V. NOMEROVANNAYA, M. M. KIRILLOVA and T. S. SHUBINA	50	Optical, electrical and magnetic properties of the intermetallic compound PdIn (β^1 phase)
YU. N. AKSHENTSEV, L. P. VORONINA and L. V. SMIRNOV	57	Structure and properties of lithium and the directionally crystallized eutectic $Cu–Cu_6Y$
V. A. MARCHENKO, N. I. KARCHEVSKAYA, A. V. RUDCHENKO and M. V. PIRUSSKIY	64	Features of the transformations and properties of low-alloy manganese–boron–vanadium steel with a structure of martensite and lower bainite
T. V. SHCHEGOLEVA and O. F. RYBALKO	69	Structure of the metastable S' - phase in alloy Al–Mg–Li
I. P. GREBENNIK and V. A. DEMIDOVA	74	Investigation of processes in contacting films of silver and germanium
V. V. SAGARADZE, I. G. KABANOVA and V. A. SHABASHOV	82	Changes of shape during the $\alpha \rightarrow \gamma$ transformation in alloy N32 with a one-component martensite texture
V. S. ZUBCHENKO, N. P. KULISH, P. V. PETRENKO, S. P. REPETSKIY and A. A. TATAROV	94	Diffuse X-ray scattering investigation of short-range order in an α solid solution of copper–aluminium
V. I. MAZUR, A. G. PRIGUNOVA and YU. N. TARAN	102	Models of Al–Si melts based on structure analysis of splat cooled products
S. V. SUDAREVA and YE. N. ZHURAVLEVA	108	On the nature of diffuse scattering in alloys of niobium with aluminium, and of titanium with transition elements
I. V. LYASOTSKIY and N. B. D'YAKONOVA	118	Structure model for discussion of the peculiarities of the b.c.c.$\rightarrow\omega$ transition in alloys of titanium and zirconium
YU. V. KORNYUSHIN, A. N. KUDRYAVTSEV and S. A. FIRSTOV	126	On the equilibrium segregation of impurities on grain boundaries

(Continued inside back cover)

ISSN 0031–918X

Printed in Poland (PWN–DUAM)

D. A. Troitskiy, V. I. Spitsyn, A. A. Gavrish, V. V. Toryanik, G. Ye. Shakh, R. I. Nazarova, V. I. Stashenko, A. S. Kozyrev, V. G. Ryzhkov and Yu. D. Gamburg — 132 — Crystallographic X-ray analysis of copper and steel after electroplastic drawing

V. M. Lazorenko, Yu. M. Platov and M. N. Pletnev — 138 — Investigation of the size distribution of interstitial dislocation loops in metals irradiated in a high-voltage electron microscope

F. F. Lavrent'yev and I. V. Gektina — 147 — The flow stress and its dependence on dislocation density in slip systems $\{11\bar{2}2\}\langle 11\bar{2}3\rangle$ in zinc crystals

V. V. Korchevskiy and L. P. Metlitskaya — 152 — X-ray diffraction investigation of plastic deformation at the tip of a crack during cycles of load

L. D. Chumakova — 157 — Study of the phase composition and preferred orientation of ε martensite in the alloy Fe-Mn by the method of inverse pole figures

Yu. A. Fedorov — 162 — The energy of a two-face dislocation wall, and the stresses generated by it

L. I. Mirkin and Ye. P. Smyslova — 169 — Angular block misalignment and the hardness of f.c.c. metal foils irradiated with laser pulses

Short Reports and Letters to the Editor

Ye. I. Kondorskiy, T. I. Kostina and N. V. Trubitsina — 173 — Phase transition and magnetostriction in chromium-cobalt and chromium-rhenium alloys

Yu. S. Kuznetsov, A. K. Shtol'ts and P. V. Gel'd — 177 — Elastic parameters of solid solutions $V_3Si_{1-x}Ge_x$ in the range 4·2–300 K

V. M. Umova and V. D. Sadovskiy — 180 — Influence of recrystallization during tempering of a steel after quenching on the formation of austenite during heating

T. Yu. Skakova, Ye. A. Golub' and L. G. Orlov — 182 — Electron microscopic analysis of grain misalignments in polycrystals

G. S. Igonin, M. B. Makogon and T. N. Igonina — 186 — Plastic changes of shape during order–disorder phase transition in alloy MgCd

B. N. Filippov and S. V. Zhakov — 189 — On magnetic phase states in films with the easy axis tilted towards the surface

A. L. Vinitskiy, M. A. Gervas'yev, A. A. Yemel'yanov and M. I. Gol'dshteyn — 192 — Peculiarities of the decomposition of chromium carbide of the M_7C_3 type in austenite

Obituary

195 — L. M. Utevskiy

THE PHYSICS OF METALS AND METALLOGRAPHY

FIZIKA METALLOV I METALLOVEDENIE

VOLUME 50, No. 2 CONTENTS 1980

Yu. A. Uspenskiy, I. I. Mazin and Ye. M. Savitskiy	1	Pseudopotential calculation of the resistivity and electron–phonon interaction of noble metals
A. K. Zvezdin and A. F. Popkov	11	Magnetic phase diagrams of hexagonal ferrimagnets in the region of the compensation temperature
Yu. I. Gorobets, L. Ya. Kosachevskiy and V. A. Tsybulko	21	Coupled magnetoelastic waves in a ferromagnetic plate with a bubble domain structure
A. I. Potekayev and N. S. Golosov	27	Temperature dependence of the long period in the model of an alloy with a plane lattice
M. A. Savchenko and A. V. Stefanovich	35	Rare-earth metal compounds with a spin glass magnetic structure
V. M. Zverev and V. P. Silin	46	Impedance of a conductive ferromagnetic plate in a magnetic field
V. T. Petrenko, M. M. Oleksiyenko, M. A. Tikhonovskiy, A. P. Berdnik, A. I. Somov and G. F. Tikhinskiy	55	Influence of microstructure on the superconductive properties of dilute copper–niobium alloys
V. I. Pecherskaya, D. N. Bol'shutkin and V. Ya. Il'yichev	61	Low-temperature electrical and galvanomagnetic properties of Fe–18 Cr–(10–25) Ni alloys
A. I. Demchenko, S. V. Sukhvalo, S. V. Kuzmichev, I. M. Romanov and A. B. Shifrin	68	Influence of magnetic field strength and chemical composition on the properties of Gd_xCo_{1-x} films
Ya. M. Pogosyan and S. D. Gevorkyan	74	Investigation of the magnetic reversal of channels in polycrystalline ferromagnetic films
Ye. D. Soldatova and T. B. Tkachenko	82	Critical indices for the $\gamma \rightleftarrows \alpha$ phase transition in cerium metal
A. L. Berezina and K. V. Chuistov	90	Peculiarities of the two-stage treatment of ageing alloys with a coherent precipitate phase
A. A. Susin, V. I. Gazov and M. I. Gitgarts	96	Peculiarities of the discontinuous decomposition of alloy Fe–8·5 at.% W
V. K. Zablotskiy, M. M. Pisklich, V. N. Voyakin and N. D. Sharaban	102	Investigation of tempering transformations of high-speed steels
M. A. Krishtal' and A. I. Volkov	108	Kinetics of the sealing of voids and microcracks in a diffusion flux
Yu. D. Kozmanov, A. D. Spektor and G. Ye. Kagan	115	Internal oxidation and the hydrogen permeability of palladium alloys
Yu. I. Chumyakov, A. D. Korotayev, L. S. Bushnev and V. F. Yesipenko	120	Work hardening in poly- and monocrystalline Cu–Al–Co alloys containing random particles
L. D. Penteleyev and V. T. Deripasko	129	X-ray diffraction method of evaluating the concentration of dislocation loops in strongly irradiated materials
A. A. Vikarchuk, A. M. Leksovskiy and Ye. A. Mamontov	135	Peculiarities of the rupture of composite materials based on electrolytic copper
M. A. Shtremel', O. N. Zharikova, L. V. Karabasova and Ya. V. Shubert	141	Grain boundary rupture as a result of irreversible temper embrittlement

(Continued inside back cover)

ISSN 0031–918X

Printed in Poland (PWN–DUAM)

V. S. Shokurov, I. I. Papirov, L. A. Korniyenko and A. A. Nikolayenko	147	Investigation of a new type of plastic flow – the formation of built-in zones
A. D. Korotayev, Yu. I. Chumlyakov, L. S. Bushnev, Yu. G. Veselov, V. F. Yesipenko and V. N. Lineytsev	156	Twinning in single crystals of heterophase Cu–Al–Co alloys
L. N. Zagoruyko and V. P. Soldatov	163	Influence of forest dislocations on creep of zinc single crystals
		Short Reports and Letters to the Editor
A. N. Kuzyukov and V. A. Levchenko	171	Influence of dislocation distribution on the rate of intergranular corrosion of austenitic steel
A. V. Bugakov, V. M. Iyevlev and V. P. Iyevlev	174	Orientation relations on the interface of epitaxial films of Au–Ni and Ag–Mo
V. P. Korobeynikov, A. A. Puzanov, V. N. Bagayev and B. N. P'yankov	178	Use of the shadow effect in the back scattering of accelerated ions to investigate the martensitic transformation in cobalt
K. I. Portnoy, V. I. Bogdanov, A. V. Mikhaylov and D. L. Fuks	182	The influence of alloying on phase equilibria in interstitial alloys
K. N. Gedgovd, A. I. Krasovskiy and S. M. Novikov	185	Diffusion of caesium in V and VI transition metals
A. I. Ushakov, A. M. Gorovoy, V. G. Kazakov and A. G. Il'chuk	189	$\alpha \rightarrow \gamma$ Phase transition induced in Fe–Ni films by pulsed laser irradiation
Ye. D. Tabachnikova, V. Z. Bengus and Yu. V. Yefimov	192	Study of the development of deformation twins in niobium and vanadium
I. Ye. Startseva, V. V. Shulika, N. V. Dmitriyeva and V. A. Lukshina	195	Magnetic anisotropy induced in iron–silicon alloys by magnetic annealing

THE PHYSICS OF METALS AND METALLOGRAPHY

FIZIKA METALLOV I METALLOVEDENIE

VOLUME 50, No. 3 — CONTENTS — 1980

I. G. Batyrev	1	Influence of short-range order on the density of electron states of binary alloys
Ye. A. Tikhonova	8	A theory of modal oscillations of wave intensity in a distorted crystal
M. A. Savchenko and A. V. Stefanovich	15	Fluctuation theory of superconductive REM compounds
I. P. Kogutyuk, V. M. Nitsovich and F. V. Skripnik	26	On the change in the sign of the Hall and Verde coefficients in transition metal oxides
I. I. Naumov, V. Ye. Panin and M. F. Zhorovkov	31	Interaction of the Fermi surface with faces of the Brillouin zone, and elastic properties of the β brass type of phase. Method of the pseudopotential
N. P. Zyryanova and V. I. Okulov	37	Dispersion equation for the potential surface plasma waves and free oscillations of the electron density of metal surfaces
L. A. Ugodnikova, S. G. Chuchman and L. M. Noskova	50	Susceptibility of Y–Tm alloys and dilute solutions of heavy rare-earth metals in yttrium
V. S. Semenov	58	Charged walls between ferromagnetic domains
V. L. Matukhin, I. A. Safin and V. F. Shamray	63	Nuclear quadrupole resonance of ^{93}Nb in ternary Nb_3Al-based phases
N. I. Kourov, Yu. N. Tsiovkin and N. V. Volkenshteyn	69	Hall effect in alloys $(Pd_xPt_{1-x})_3Fe$ based on ferromagnetic Pd_3Fe
V. G. Fedorov, L. Ye. Alekseyeva and N. N. Novikov	76	Influence of hydrogen on the $\gamma \rightarrow \alpha$ transformation and structure state of a steel
G. V. Seregin	81	Peculiarities of structure formation in alloys which age with precipitation of a γ' phase during slow cooling
S. A. Demin, A. I. Ustinov and K. V. Chuistov	86	Formation of a twin structure in alloys based on γ-Mn during the f.c.c. to f.c.t. transformation
A. D. Korotayev, A. N. Tyumentsev, Yu. P. Pinzhin, Yu. R. Kolobov, M. G. Glazunov, K. A. Markov and N. G. Minayev	92	Influence of the structural state on the mechanism by which a non-metallic phase is formed during diffusion saturation of niobium alloys with oxygen
I. Ya. Dekhtyar, Sh. A. Rustamov, R. G. Fedchenko and M. I. Dekhtyar	100	Interaction of positrons with radiation defects in niobium
A. Sh. Shneyderman	104	An evaluation of the role of retained austenite during $\alpha \rightarrow \gamma$ transformation in steel
V. N. Gridnev, V. G. Gavrilyuk, V. M. Nadutov and Yu. A. Polushkin	110	Redistribution of carbon and alloying elements during plastic deformation and subsequent heating of steel
I. G. Kabanova and V. V. Sagaradze	116	Theoretical analysis of the crystal geometry of the reverse martensitic transformation $\alpha \rightarrow \gamma$
S. N. Komnik, V. V. Demirskiy and I. V. Biblik	128	Thermally activated plastic deformation of α solid solutions of copper and aluminium in the range 20–300 K
V. G. Badalyan	137	Effect of ultrasonic vibrations on the transient creep process of copper

(Continued inside back cover)

ISSN 0031-918X

Printed in Poland (PWN–DUAM)

Short Reports and Letters to the Editor

R. Sh. Malkovich	143	Calculation of impurity distribution from the concentration dependence of the diffusion coefficient
S. G. Psakhye, V. Ye. Panin, Ye. V. Chulkov and M. F. Zhorovkov	145	Pseudopotential calculation of the binding energy of a zinc atom with a vacancy in aluminium
T. G. Garbovitskaya and L. N. Paritskaya	148	On the role of the overlap during mutual diffusion in thin-film specimens of the "end-window" type
A. V. Lyakutkin	152	A study of the direct $\delta \rightarrow \alpha$ transition in iron from measurements of the susceptibility
A. I. Volokitin	155	Green's function for an ordered lattice of adatoms
K. P. Gurov, B. Million, V. N. Pimenov, Ya. Ruzhichkova and V. S. Khlomov	157	On the influence of the ordering peak on mutual diffusion in binary solid solutions
G. K. Dvoryadkina, A. S Ivanov and S. A. Borisov	160	On the redistribution of impurities by uphill diffusion in small particles
V. M. Iyevlev, S. B. Kushchev and V. V. Kombarov	162	Structure of the interface in two-layer epitaxial films of W–Mo
I. Ye. Kurov, S. N. Nagornykh, V. N. Perevezentsev and M. Ye. Gerenrot	166	The influence of deformation rate on the kinetics of stimulated electron emission of metals
A. M. Belikov, A. Yu. Vasilenko and A. T. Kosilov	170	Morphology of $\beta_1 \rightarrow \beta_1'$ transformation of Cu–Al–Ni crystals in uniaxial tension
Yu. S. Pyatiletov	174	Contribution of dislocation glide to the radiation creep of metals
V. V. Kiselev and V. T. Shmatov	176	Energy of low-angle boundaries of grains and blocks near the surface of a specimen
I. M. Razumovskiy	179	On pretransition phenomena in cobalt
A. A. Alekseyev	182	On the strengthening mechanism of alloy Al–Cu during high-temperature ageing treatment
N. D. Zemtsova and Ye. I. Starchenko	185	Possibility of the development of cellular decomposition by migration of small-angle boundary
V. Ye. Zinov'yev, A. V. Mal'gin, G. P. Zinov'yeva and K. I. Yepifanova	190	Anisotropy of ultrasonic velocity in gadolinium in the range 80–700 K
V. M. Kuz'menko, V. I. Mel'nikov and A. I. Sudovtsov	193	Hall effect in amorphous gallium
V. P. Korobeynikov, L. A. Kazak, A. A. Puzanov and B. N. P'yankov	195	Variation in the stability of a solid solution in relation to structure phase transformations during ion bombardment
F. Khimmatkulov, V. V. Singer, I. Z. Radovskiy, P. V. Gel'd and A. G. Mal'tsev	197	High-temperature susceptibility of alloys Co–Cr and Co–Mn
Ya. V. Naglyuk and L. M. Sandler	201	Magnetic anisotropy and the dislocation structure of single crystals of Fe–3% Si
M. P. Kashchenko	203	Coordination of the concentration dependence of martensitic transformation points in systems Fe–Na and Fe–Mn with conditions of generation in the phonon maser model
	205	Sergey Vasil'yevich (on his 70th birthday)

THE PHYSICS OF METALS AND METALLOGRAPHY

FIZIKA METALLOV I METALLOVEDENIE

VOLUME 50, No. 4 CONTENTS 1980

A. G. Veprev and V. P. Shirokovskiy	1	Phonon resistivity in vanadium
V. P. Kalashnikov, M. I. Auslender and V. V. Karyagin	10	Thermoelectric coefficients of a ferromagnetic metal near the Curie point
I. G. Ratishvili and N. A. Dateshidze	17	Possible sequence of the structures arising in hydride Nb_4H_3 during temperature variation
V. N. Fedosov and Ye. I. Chursina	25	Magnetic dipole in a ferromagnet containing a Bloch wall
Farid A. Khavadzha and V. M. Silonov	30	Influence of *s–d* hybridization on the permittivity of noble metals
Ye. A. Turov and A. A. Lugovoy	36	Magnetoelastic oscillations of domain boundaries in ferromagnets. I. Resonance modes
V. M. Pan, V. S. Flis, V. I. Latysheva, Yu. I. Beletskiy and G. A. Klimenko	47	Superconductive properties of tubular elements with diffusion layers of Nb_3Sn
G. N. Zhizhin, M. A. Moskaleva, Ye. V. Shomina and V. A. Yakovlev	51	Determination of the optical constants of metals in the infrared range from the propagation of surface electromagnetic waves
A. S. Yermolenko	57	Magnetocrystalline anisotropy of compounds $Y_{1-x}Gd_xCo_5$
N. A. Tulina	62	Influence of purity on the magnetic properties of rhenium in the superconductive state
N. Ye. Alekseyevskiy and V. N. Narozhnyy	69	Influence of pressure on the properties of compound La_3S_4 in the superconductive and normal states
A. A. Glazer, V. M. Mishin and R. I. Tagirov	74	Influence of magnetic annealing on the induced magnetic anisotropy of amorphous gadolinium–cobalt films
L. I. Kaygorodova, N. N. Buynov and M. F. Komarova	78	Influence of quenching conditions on the structure and properties of aluminium–zinc–magnesium and aluminium–magnesium alloys
A. M. Ovcharenko, B. A. Brusylovskiy and A. P. Getmanskiy	88	X-ray diffraction investigation of the texture and substructure in hydropressed carbon steels
A. T. Kosilov, A. I. Olemskoy and A. M. Perevoznikov	95	Influence of alloying elements on the martensitic transformation in copper–aluminium alloys
G. V. Ivanova, G. M. Makarova, L. M. Magat and N. N. Shchegoleva	99	Decomposition of the solid solution in single crystals of alloy Fe–33 at.% Pd
V. F. Sukhovarov, Yu. V. Svitich, V. V. Karavayeva and G. V. Seregin	105	Discontinuous decomposition of the γ' phase in deformed alloys
L. A. Monasevich, V. Ye. Yegorushkin, Yu. I. Paskal' and V. P. Fadin	112	Rhombohedral structure modification of titanium nickelide
M. V. Mal'tsev, Yu. V. Sokolov, N. I. Kashnikov and L. D. Sokolov	117	Influence of plastic deformation on phase transformations of titanium alloy VT 16 during ageing

(Continued inside back cover)

ISSN 0031-918X

Printed in Poland (FWN – DUAM)

G. I. Nosova and N. A. Polyakova	124	Dislocation structure and strength parameters of single crystals of the ordered alloy Ni_2Cr
D. N. Bol'shutkin, V. A. Desnenko and V. Ya. Il'yichev	131	Low-temperature plastic deformation of steels Kh18N (10–15)
I. I. Mints, M. M. Shteynberg, A. P. Smirnova and N. G. Shul'gina	137	Investigation of the characteristics of void formation during creep of Cr–Mo–V steels
A. N. Vergazov, V. M. Rumyantseva (dec.), V. V. Rybin, I. N. Sinyakov and Yu. V. Solonko	143	Influence of ruthenium on the mechanical properties of molybdenum
O. P. Karasevskaya and K. P. Ryaboshapka	151	The rocking crystal method of evaluating the dislocation density during high-temperature creep in tungsten single crystals
S. N. Komnik and I. T. Ponomarenko	159	Influence of the original purity of metals on the low-temperature mechanical parameters of fine-grained Zn–Al alloys
Ye. E. Glikman, R. E. Bruver (dec.), A. A. Krasov and S. V. Trubin	163	Brittle failure of Fe–P solid solutions and the mechanism of "spontaneous" nucleation of microcracks on grain boundaries
		Short Reports and Letters to the Editor
Ye. V. Ugarova, N. T. Travina and Yu. D. Tyapkin	173	Spatial distribution of γ' phase particles and its connection with the properties of polycrystalline ageing alloy Ni–14 at.% Al
V. B. Apkhanov, A. N. Belousov, V. A. Yegorov and N. A. Manakov	176	Crystal structure and coercive force of $TbFe_2$ films
A. V. Vaynshteyn, V. A. Aleshin, V. S. Borovikov, N. V. Papina and R. P. Shmalenyuk	178	Characteristics of heterogeneous microdeformation
V. A. Rassokhin, A. F. Prekul and B. Gren'	182	On the low temperature resistivity minimum in non-equilibrium alloys
V. Ye. Zhitarev, N. M. Okuneva, S. B. Stepanov and A. I. Slutsker	185	Peculiar features of the small-angle scattering of cold neutrons by different metals
V. Ye. Rode, S. A. Finkel'berg, V. V. Kisilev and T. M. Vizhenskaya	187	Investigation of exchange anisotropy in alloys of iron with chromium and nickel
V. O. Yesin, I. G. Brodova, G. N. Pankin and I. P. Korshunov	190	Condition of growth for twin dendrites during the directional crystallization of Al–Cu and Al–Zn alloys
V. Ye. Zinov'yev, L. N. Petrova, Ye. G. Dik, and A. D. Ivliyev	193	Correlation of the heat capacity and temperature coefficient of the resistivity of ferromagnetic alloys near the Curie point
V. I. Minakov and V. N. Fedosov	197	Radiation hindrance of narrow domain walls in ferromagnets
	200	Obituary

THE PHYSICS OF METALS AND METALLOGRAPHY

FIZIKA METALLOV I METALLOVEDENIE

VOLUME 50, No. 5 — CONTENTS — 1980

Ye. A. Turov and A. A. Lugovoy	1	Magnetoelastic oscillations of domain walls in ferromagnets. II. Generation and scattering of sound
V. P. Kalashnikov, N. V. Kozhevnikov and A. B. Zolotovitskiy	11	Electron processes of spin relaxation in ferromagnetic metals and semiconductors. II. Diffusion decay
Z. A. Gurskiy and B. A. Gurskiy	23	Pseudopotential of transition metals
I. G. Batyrev	31	Enthalpy of formation of binary alloys with short order
M. M. Chesalov	38	Third-order elastic moduli of simple metals
K. B. Vlasov, V. I. Timoshchuk, A. V. Tkach and Ye. P. Romanov	49	Orientation of the easy directions and axis of antiferromagnetism in a single crystal of MnB_2
A. S. Yermolenko	53	Magnetic properties of $Y_{1-x}Nd_xCo_5$ alloys
L. S. Palatnik, L. I. Lukashenko and Yu. V. Zolotnitskiy	60	Charged domain walls in thin ferromagnetic films
I. I. Sasovskaya	64	Optical properties of intermetallic compound TiFe
V. M. Kuz'menko and V. I. Mel'nikov	71	Possibility of magnetic ordering in amorphous manganese
R. A. Gaziyev, V. S. Demidenko and V. Ye. Panin	75	Investigation of the band structure, near the Fermi level, of Fe–Mn alloys doped with chromium
A. Z. Men'shikov and A. Ye. Teplykh	81	Magnetic state of disordered γ-NiMnCr alloys
V. N. Pushkar', A. I. Mitsek and S. I. Kuz'mina	88	Change in the magnetic state of a ferromagnetic polycrystalline film during diffusion of an impurity with formation of antiferromagnetic inclusions
A. P. Vokhmyanin, V. V. Kelarev, A. N. Pirogov, V. V. Chuyev and S. K. Sidorov	95	Magnetic transformations during temperature variations in ordered $Fe_xMn_{1-x}Pt_3$ alloys
I. G. Kiliptari and T. M. Shavishvili	99	Nuclear magnetic resonance of ^{59}Co in alloys Co–Cu (Si and Ge). Short-range order and screening
M. A. Shtremel', S. A. Nikulin, V. P. Kanev and A. P. Domogatskiy	105	Formation and stability of "secondary" austenite in manganese duplex steels
N. N. Buynov, L. I. Kaygorodova, E. Ya. Kaufman, M. F. Komarova, L. V. Rabinovich and T. A. Kharitonova	112	Electron microscopic analysis of the structure and size stability of alloys SAS1
V. D. Sadovskiy, L. I. Bershteyn, A. A. Mel'nikova, A. M. Polyakova and V. M. Schastlivtsev	120	Structure inheritance in cast steel 30KhGNM
S. Tkaczyk and M. Tokarski	127	Influence of the time at supersaturation temperature on the natural ageing process of alloy $AlMg_5$
I. A. Gindin, V. I. Sokolenko and Ya. D. Starodubov	133	Recovery of the resistivity and flow stress of polycrystalline zirconium after alternating deformation at 4.2 K and annealing treatment

(Continued inside back cover)

ISSN 0031-918X

Printed in Poland (PWN–DUAM)

V. Ye. Danil'chenko and A. I. Ustinov	140	Peculiar features of the decomposition of martensite in quenched high-nickel steels
D. G. Borshchevskaya and V. Z. Kutsova	146	Sporadic disturbances of the regular growth of eutectic composites
M. R. Nemirovskiy, Yu. R. Nemirovskiy and A. A. Rudakov	153	Phase and structural variations during the strain-induced $\gamma \rightleftarrows \varepsilon$ transformation in alloy 30Kh12G23
M. S. Blanter	160	Interaction of a $\frac{1}{2}$ [111] $(\bar{1}10)$ dislocation with complexes of interstitial atoms in metals with a b.c.c. lattice

Short Reports and Letters to the Editor

L. I. Kogan, M. P. Usikov and R. I. Entin	165	Intermediate (bainitic) transformation of austenite in a steel with 1% C and 7% Al
G. I. Nosova and N. A. Polyakova	168	Phase composition, strength parameters and dislocation structure of alloy Ni–Mo–Fe
V. A. Volkov	172	Electrical resistance of metals with vacancies
Yu. N. Chentsov	176	Influence of complex inoculation on internal boundary adsorption of undesirable impurities in cast iron
V. I. Krylepov, N. A. Manakov, G. I. Rusov and Ye. V. Ivanova	180	The magnetic properties of rapidly quenched alloys SmFe
S. A. Zakharov	183	Influence of the demagnetizing factor on the longitudinal magnetostriction of a specimen of alloy $TbFe_2$
V. N. Soplyachenko, Ye. G. Povolotskiy and G. P. Vasin	186	On the γ phase transformation in ticonal
A. A. Bryukhanov, T. S. Sovkova and V. V. Usov	189	The crystallographic texture and anisotropy of the elastic properties of alloy Ti–Al–V
S. A. Nikitin, G. I. Katayev and N. P. Arutyunyan	194	Influence of magnetic dilution on the magnetic properties of rare-earth terbium–yttrium alloys
V. A. Duryagin, A. B. Kuslitskiy and I. P. Pistun	197	Development of slip bands in medium-carbon steel during low-cycle fatigue
A. B. Dichenko	200	The magnetization and longitudinal susceptibility associated with dislocations in piezomagnetic antiferromagnets

THE PHYSICS OF METALS AND METALLOGRAPHY

FIZIKA METALLOV I METALLOVEDENIE

VOLUME 50, No. 6 — CONTENTS — 1980

V. P. KALASHNIKOV, A. B. ZOLOTOVITSKIY and N. V. KOZHEVNIKOV	1	Electron spin relaxation processes in ferromagnetic metals and semiconductors. III. Uniform relaxation
A. F. YERMOLOV and A. S. SIGOV	14	Impurity spin behaviour of an antiferromagnetic matrix in a zero exchange field
K. B. VLASOV and YA. G. SMORODINSKIY	21	Reflection and transmission factors of elastic waves for a plane-parallel plate with a helical cone magnetic structure
V. YA. SVERDLOV, A. I. SOMOV and M. A. TIKHONOVSKIY	30	Microstructure and properties of superconductive eutectic composite $Zr–ZrV_2$. I. Influence of crystalline conditions and additions of niobium and iron on the microstructure
V. YA. SVERDLOV, A. P. BERDNIK, M. A. TIKHONOVSKIY, V. M. ARZHAVITIN and A. I. SOMOV	37	Microstructure and properties of superconductive eutectic composite $Zr–ZrV_2$. II. Superconductive transition, microhardness and resistivity
V. V. KOKORIN and I. A. OSIPENKO	42	Peculiar features of the magnetic properties of decomposed Cr–Fe solid solutions
N. YE. ALEKSEYEVSKIY and A. V. MITIN	47	Investigation of the critical parameters of superconductive molybdenum sulphides
A. S. YERMOLENKO and A. F. ROZHDA	53	Orientation phase transitions in alloys $Sm_{1-x}Nd_xCo_5$
V. A. TROFIMOVA, K. M. KOLOBOVA and S. A. NEMNONOV (dec.)	58	Determination of the arrangement of the 3*d* bands of the elements from the X-ray spectra of alloys
B. N. FILIPPOV, YU. G. LEBEDEV, YE. I. RAYEVSKIY and A. P. TANKEYEV	62	Bubbles inside multilayer ferromagnetic films
B. A. DANIL'CHENKO, M. P. KRULIKOVSKAYA and L. I. CHIRKO	73	Investigation of the influence of γ radiation intensity on the disordering process in alloy β-Cu–Zn
V. YA. GOL'DSHTEYN, S. V. PASHCHENKO, S. N. GRAZHDANKIN, S. G. NITSKAYA and S. M. VLADIMIROV	78	Structure formation in an Fe–3% Si alloy during hot rolling
YE. V. NESTEROVA, V. V. RYBIN, S. S. USHKOV and G. I. KOLODKINA	83	Investigation of the nature of the thermal embrittlement of low α alloys of titanium
M. A. KRISHTAL and B. D. MAKARKIN	90	Kinetic peculiarities of the migration of a layer of intermetallic constituents precipitated on the original surface in binary alloys during diffusion
A. M. GLEZER, B. V. MOLOTILOV and O. L. UTEVSKAYA	95	Structural aspects of order–disorder transformations in alloy Fe–Ga
S. F. KURTASOV and A. B. LAPIN	102	Texture analysis of a wire of alloy EI435
YU. S. PYATILETOV	107	Influence of vacancy loops on the radiation "swelling" of metals
S. M. BITYUKOV, N. V. ZVIGINTSEV, N. A. RUNDKVIST, M. S. KHADYYEV and V. F. CHERVINSKIY	112	Investigation of phase transformations and the structure of maraging steel 07Kh11K10M6

(Continued inside back cover)

ISSN 0031-918X

Printed in Poland (PWN – DUAM)

A. V. Dobromyslov	118	Influence of elastic strain fields round particles of equilibrium shape on diffuse X-ray scattering
V. A. Tsurin and A. Ye. Yermakov	129	Nuclear gamma resonance investigation of ordering in aerosol powders of alloy $Fe_{53}Pd_{47}$
S. F. Dubinin, S. G. Teploukhov, Yu. A. Izyumov, V. N. Syromyatnikov and S. K. Sidorov	133	On the symmetry relation of phase during the martensitic transformation in iron–nickel Invars
S. A. Voronin, A. F. Yedneral, V. I. Kiriyenko and M. D. Perkas	141	Thermomechanical strengthening of maraging alloys
V. S. Shokurov, L. A. Korniyenko, A. A. Nikolayenko and I. I. Papirov	148	Influence of deformation conditions of the formation of built-in zones
V. A. Gol'tsov, I. Yu. Machikina and N. I. Timofeyev	153	Hydride plasticity of hydrogen-precipitation hardened metals and alloys
A. B. Borisov, V. A. Feygin and V. T. Shmatov	157	Interaction of an edge dislocation with an opening crack in a hydrostatically compressed crystal
		Short Reports and Letters to the Editor
I. V. Zolotukhin, I. N. Panteleyev and V. Ye. Miloshenko	165	Some superconductive parameters of amorphous alloy La–20 at.% Al produced by quenching from the liquid state
V. I. Shcherbak	167	Kinetic study of the development of radiation damage in neutron irradiated nickel
A. A. Vaynshteyn, Ye. A. Mityushov and B. A. Gal'perina	171	Influence of the spread of grain orientations on the elastic properties of the axial textures of metals with f.c.c. and b.c.c. lattices
G. I. Nosova and N. A. Polyakova	175	Temperature dependence of the critical shear stresses of ordering alloy Ni_3Mn
Ye. S. Krupnikov, F. Yu. Aliyev and I. G. Kerimov	178	Temperature dependencies of the kinetic coefficients of bismuth films
Yu. N. Koval', S. Yu. Kondrat'yev, R. Ya. Musiyenko, L. G. Khandros and G. Ya. Yaroslavskiy	181	Features of the martensitic transformation in Cu–Zn–Al alloys